

Q100G-BX40-49

100GBASE-BX40 QSFP28 | TX 1304.58 / RX 1309.14 nm | 40 km

1. Product overview

100GBASE-BX bidirectional QSFP28 transceiver for up to 40 km over single-mode fiber, with simplex LC connectivity. The source cover specifies TX 1304.58 nm and RX 1309.14 nm. Use with a transceiver or network interface having complementary wavelengths. Real-time digital diagnostics are accessible through I2C according to QSFP28 MSA.

2. Key features

- Hot-pluggable QSFP28; Ethernet CAUI-4 electrical interface
- PAM4 optical modulation; high-sensitivity APD receiver
- Single 3.3 V supply; simplex LC receptacle
- IEEE 802.3bs and 100G Lambda MSA alignment; RoHS-6

3. Applications

100G Ethernet, data centers and storage area networks; transmission up to 40 km.

4. Technical data

Parameter	Specification
Form factor / optical connection	QSFP28 / simplex LC, single-mode fiber
Absolute supply voltage	0 to 3.6 V
Storage / humidity	-40 to +85°C / 0-85%, non-condensing
Absolute optical damage threshold	-2.4 dBm minimum
Mechanical drawing values	73.80 ±0.1; 4.20 ±0.1; 18.65 ±0.25; 18.35 ±0.1; (18.65); (128); (13.55); (44); 1.20 ±0.1; 8.50 ±0.1; 3.25 ±0.1. Units not stated in drawing.

Electrical characteristics - Values apply per lane where stated.

Transmitter	Specification	Receiver	Specification
Signaling rate	25.78 Gb/s, CAUI-4	Signaling rate	25.78 Gb/s, CAUI-4
Differential input impedance	100 ohm typical	Common-mode voltage	-350 to 2850 mV
Differential input voltage	900 mV max	Common-mode noise RMS	17.5 mV max
Input impedance mismatch	10% max	Termination mismatch at 1 MHz	10% max
Input high voltage	2 to Vcc+0.3 V	SDD22 return loss	Per CEI-28G-VSR
Input low voltage	-0.3 to 0.8 V	SDC22/SCD22 conversion	Per CEI-28G-VSR
Host electrical interface	CAUI-4	SCC22, 250 MHz-30 GHz	-2 max; source unit blank
Pre-FEC BER, CAUI4 mode	2 x 10 ⁻⁴	20/80% transition time	9.5 ps min
Optical TX/RX symbol rate	53.125 ±100 ppm GBd	VEC	6.5 dB max
Optical modulation	PAM4	Eye width / height, 10 ⁻¹⁵	0.57 UI / 228 mV min

38-pin assignment: CML TX p/n, lanes 1-4: 36/37, 3/2, 33/34, 6/5 (non-inverted/inverted inputs). CML RX p/n, lanes 1-4: 17/18, 22/21, 14/15, 25/24 (outputs). GND: 1,4,7,13,16,19,20,23,26,32,35,38. LVTTTL: 8 ModSelL, 9 ResetL, 27 ModPrsL (grounded inside module), 28 IntL, 31 LPMode (active high). LVCMOS: 11 SCL, 12 SDA (two-wire clock/data). Supply: 10 VCC_Rx, 29 VCC_Tx, 30 VCC1, each +3.3 V.

5. Recommended operating conditions

Parameter	Specification
Supply voltage min / typ / max	3.135 / 3.3 / 3.465 V
Supply current typ / max	1.2 / 1.36 A
Power consumption typ / max	4 / 4.5 W
Case temperature / link distance	0 to +70°C / 40 km maximum

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6. Optical characteristics

Transmitter	Specification	Receiver	Specification
Rate / modulation	53.125 ±100 ppm GBd (CAUI-4); PAM4	Rate / modulation	53.125 ±100 ppm GBd (CAUI-4); PAM4
UP-LINK wavelength	1304.58 ±1.0 nm	UP-LINK wavelength	1309.14 ±1.0 nm
DOWN-LINK wavelength	1309.14 ±1.0 nm	DOWN-LINK wavelength	1304.58 ±1.0 nm
SMSR		Damage threshold [3]	-2.4 dBm min
Average launch power [1]	1.7 to 7.1 dBm	Average receive power [4]	-16 to -3.4 dBm
OMAouter, TECQ <1.4 dB	4.7 min / 7.9 max dBm	Receive OMAouter	-2.6 dBm max
OMAouter, TECQ >1.4 dB	3.3 + TECQ dBm min	Receiver reflectance	-26 dB max
TDECQ / TECQ	3.9 / 3.9 dB max	Sensitivity OMAouter [5]	max(-13.8, TECQ-15.2) dBm
TDECQ - TECQ	2.7 dB max	Stressed sensitivity OMAouter [6]	-10 dBm max
Extinction ratio	5.0 dB min	Transmitter reflectance (repeated)	-26 dB max
Optical return loss tolerance	15 dB max	LOS Assert	-30 to -19.5 dBm
Transmitter reflectance [2]	-26 dB max	LOS De-assert	-16.5 dBm max
TX-off average launch power	-15 dBm max	LOS hysteresis	0.5 dB min
RIN15.6OMA	-136 dB/Hz max	Stress-test SECQ, lane under test	3.9 dB max

[1,4] Minimum average TX/RX power is informative: below it compliance is not possible; above it compliance is not assured. [2] Reflectance is defined looking into the transmitter. [3] Receiver must tolerate continuous modulated input at this level without damage. [5] CAUI4 pre-FEC BER: 2E-4. [6] TP3 conformance test signal at BER specified in IEEE 802.3cd. Source does not define the OMA branch at TECQ = 1.4 dB.

7. Digital diagnostics and management

Parameter	Specification
Diagnostic absolute error	Temperature ±3°C over operating temperature; Vcc ±0.1 V over full operating range; channel RX/TX power ±3 dB; channel bias ±10% (source unit mA).
Interface	I2C / two-wire management, real-time operating parameters; QSFP28 MSA.

Diagnostic memory map - address (size in bytes): 0-3 (4): ID/status, SFF-8024 module ID, version, type, flat memory, CLEI, max TWI speed, module and interrupt state. 4-7 (4): lane flag summary, pages 10h-1Fh. 8-13 (6): module flags. 14-25 (12): module monitors. 26-30 (5): global controls. 31-36 (6): module flag masks. 37-38 (2): latest CDB command status. 39-40 (2): firmware version. 41-63 (23): reserved. 64-82 (19): vendor/module custom area. 83-84 (2): inactive firmware version; 00h means single-image support. 85-117 (33): application advertising, supported host/media interface combinations. 118-125 (8): password entry/change. 126 (1): bank select. 127 (1): page select. Module-level flags/monitors exclude lane/data-path-specific items.

8. Safety and regulatory

IEEE 802.3bs; 100G Lambda MSA; QSFP28 MSA; Ethernet CAUI-4; RoHS-6. Optical test references IEEE 802.3cd; electrical characteristics reference CEI-28G-VSR. The source does not specify laser safety class or ESD limits.

9. Ordering information

Parameter	Specification
Q100G-BX40-49	100GBASE-BX40 QSFP28; TX 1304.58 / RX 1309.14 nm; SMF, simplex LC, 40 km